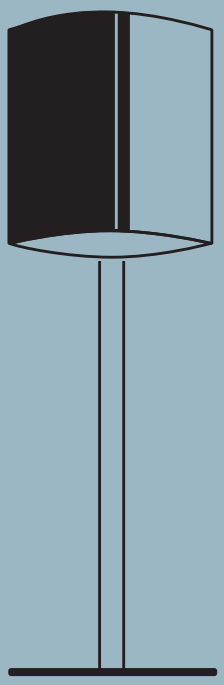
BeoLab 4000 MKII

Type 6642, 6643, 6644, 6645, 6646, 6647, 6648

Service Manual
English

German, French, Italian, Spanish, Danish, Dutch and Japanese versions are available in the Retail System



This Service Manual must be returned with the defective parts/back-up suitcase !

BANG & OLUFSEN

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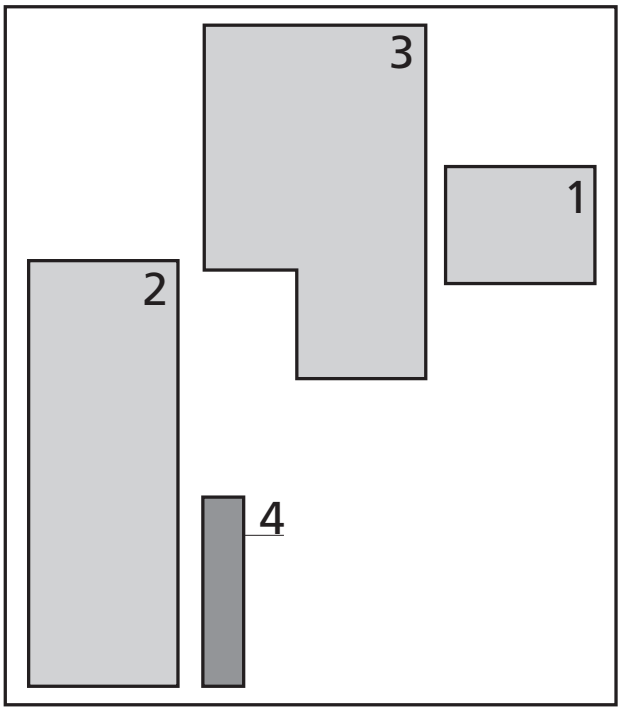
Survey of modules



PCB01	Amplifier
PCB02	SMPS
PCB03	Main PCB
PCB04	LED

How to service

Front line service

BeoLab 4000 MKII is to be serviced in the customer's home when it comes to electrical symptoms or exchange of mechanical parts. In this way you avoid having to make more than one visit and using minimum of time on the case, all for the benefit of the customer.
BeoLab 4000 MKII has been split-up into as few service items as possible. Each service friendly item is packed individually, prepared for worldwide transport, and has a separate seven digit spare part number to be found in the Service Manual or on the Bang & Olufsen Retail System. The exploded view drawing will show the service spare parts.
All necessary electrical modules and the two loudspeaker units can be ordered to prepare front-line service. Cabinet parts must also be brought with you separately, if to be replaced in the customer's home.

To improve the quality and secure a better service please send the defective part for quality analyse purposes to:

Att:
Bang & Olufsen Operation a/s
Att.: JEB 7210-3
Peter Bangsvej 15
DK-7600 Struer

Please remember to fill-in a fault description (part no.: 3542206).

Delivery

There is several type numbers for BeoLab 4000 MKII, however, this is only due to market approvals. All types can be used on all markets with 100 to 240 V (ac) mains voltage. When you order BeoLab 4000 MKII (set of two) two mains cables and two Power Link cables are included.

Installation and setting-up

Only the switch for Left, Right or Line must be set into correct position as described in the User Guide, before Power Link or a Line signal and AC power wires are connected. If Power Link is used, the switch is for Left or Right setting. If a Line signal (0 to 1V) is connected (via phono-male to PL Line-in) part no. see Parts not shown) the switch must be set to Line position. See more details in the User Guide. The LED will indicate on (green) or off (red).

Fault Finding

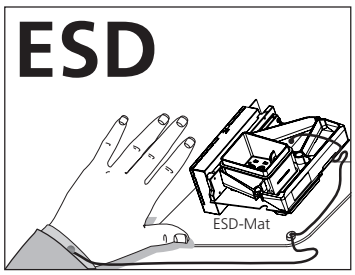
Before troubleshooting is initiated, let the customer demonstrate the fault, if possible. There are four electrical modules in the product. Therefore a faulty module is easy to point out in most cases. The PCB's has been divided into: PCB01, Amplifier - PCB02, SMPS - PCB03, Main PCB and PCB04, LED.
No special service programs are available in this product or via the ServiceTool.
If there is a fault in the PCB02, SMPS or PCB01, Amplifier the LED is typically off.

Replacement

Each loudspeaker is individually adjusted from production to ensure optimal stereo perspective. When replacing a speaker unit bass/treble level have to be adjusted. On the back of the new unit will be printed a rated value for the sensitivity of the particular unit. The rated value is rated in dB.

Warnings

ESD



When electrical replacement or disassembly is taking place, use an ESD-mat. The internal electronics are very sensitive to static electricity.

Handling

Wear cotton gloves to avoid any fingerprints on the product.
The surfaces on the product are very sensitive, so handling should be done with great care to avoid damage.

Cleaning

Clean the surfaces of the BeoLab 4000 MKII using a soft, lintfree cloth which you have wrung firmly in a solution of lukewarm water containing a few drops of mild household cleaner, for example a dish washing detergent. The cooling fins on the rear may be cleaned using a soft brush or a vacuum cleaner. The front cloth may be cleaned with a vacuum cleaner set to the lowest level.

Note: Never use alcohol or other solvents to clean any part of the BeoLab 4000 MKII !

Insulation test

The product must be insulation tested after having been dismantled. Make the test when the set has been reassembled and is ready to be returned to the customer. Flashover must not occur during the test.

Make the insulation test as follows:
Short-circuit the two pins of the mains plug and connect them to one of the terminals of the insulation tester.
Connect the other terminal to ground on the Power Link socket.

NOTE!
To avoid damaging the product it is essential that both terminals of the insulation tester have good contact.

During the test the current must not exceed 10 mA.
Slowly increase the voltage on the insulation tester until a voltage of 2.5 kV (ac) is obtained. Maintain the voltage level for one second, then slowly decrease the voltage to 0 V (ac).

Adjustments

Adjustments after replacing PCB03, Main PCB

Read out the adjustment position of the old potentiometers, R301 & R312, and set the new potentiometers to the same position.

Adjustments of bass/treble levels

Each loudspeaker is individually adjusted from production to ensure optimal stereo perspective. When replacing a speaker unit or PCB03, Main PCB, bass/treble levels have to be adjusted. On the back of the new speaker unit will be printed a rated value for the sensitivity of the particular unit. The rated value is stated in dB and have to be converted to a mechanical position of the two potentiometers by using table 1 and fig.1.

After replacing a speaker unit

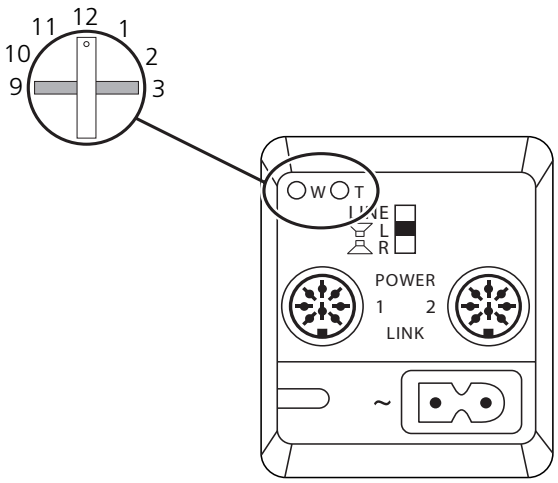
- Adjust treble level by means of (R301) and the bass level by means of (R312). These two potentiometer are accessible via the two holes in the socket well, see fig. 1.
- Adjusts according to the drawing and table 1. Only the potentiometer of the replaced unit have to be adjusted.

WARNING: Do under no circumstances adjust the level of a unit that has not been replaced!

Table 1

"Clock position" (The new position of the potentiometer)	Bass deviation ±dB	Treble deviation ±dB
0830	+3.1	+3.9
0900	+2.7	+3.3
1000	+1.8	+2.2
1100	+0.9	+1.1
1200	0.0	0.0
0100	-0.9	-1.1
0200	-1.8	-2.2
0300	-2.7	-3.3
0330	-3.1	-3.9

Fig.1

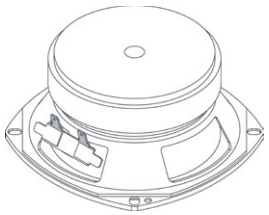


Repair tips

Hum in loudspeaker when no music is played

The Power Link cable must be of type MK III or higher.
The ground connection in Power Link cable lower than MK III may be insufficient for optimum sound performance.

Power Link
MK III



Check loudspeaker units

The loudspeaker units can be checked by an ohm-meter.
OK values for tweeter and woofer are approx. 6 Ω.

How to check the Switch Mode Power Supply

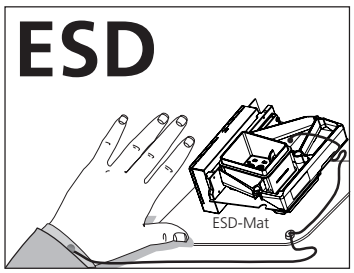
- Take off the baffle.
- Connect an audio signal (set the input switch corresponding to the applied signal).
- Connect mains, 100 - 240V.
- Confirm 12V standby on PCB02, SMPS P2 pin 6, GND pin 3 (if not OK, replace PCB02, SMPS).
- Confirm 12V HT_ON, on PCB02, SMPS P2 pin 8 (if not OK replace PCB03, Main PCB).
- Confirm ±12V on PCB02, SMPS P2 +12V pin 1, 2 and -12V pin 4, 5 (GND pin 3). If not OK replace PCB02, SMPS.

Replacement of modules

Modules that can be replaced

BeoLab 4000 MKII in service position 5.2
Replace PCB01, Amplifier 5.4
Replace PCB02, SMPS 5.5
Replace PCB03, Main PCB 5.6
Replace PCB04, LED 5.7

Warning – Static electricity



Static electricity may damage the product.
A static-protective field service kit must always be used when the product is disassembled or modules are being handled.

Notice!
All modules must be placed on the ESD-mat or in an ESD-proof bag.

Purpose of replacement of modules

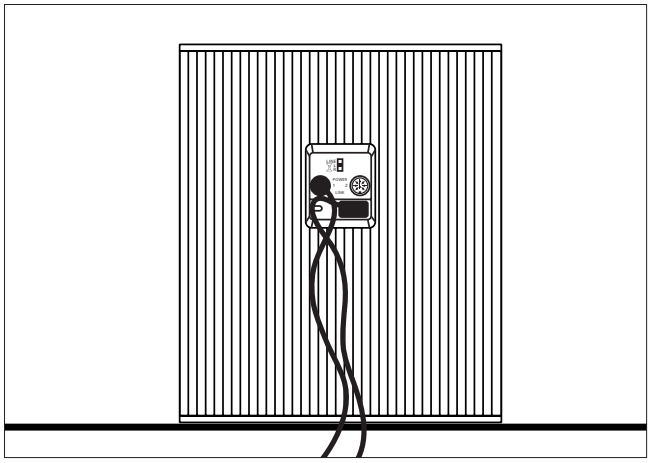
Short instructions for replacement of the available modules, with reference to additional illustrations:

- The correct sequence for replacing modules.
- Text and illustrations.
- Reference to adjustment.

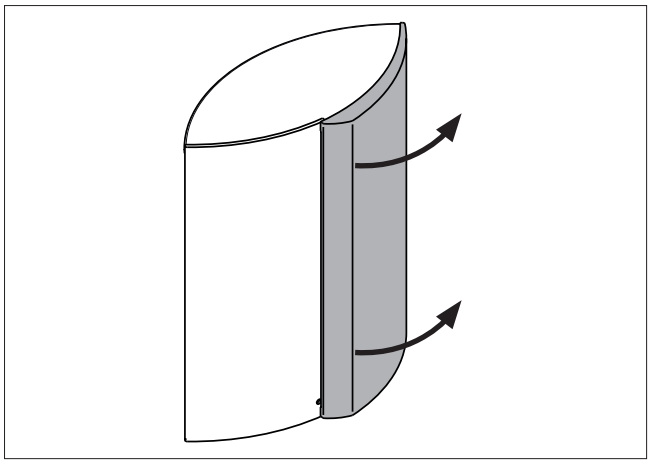
Adjustments

After replacing PCB03, Main or a loudspeaker an adjustment is required, see adjustments.

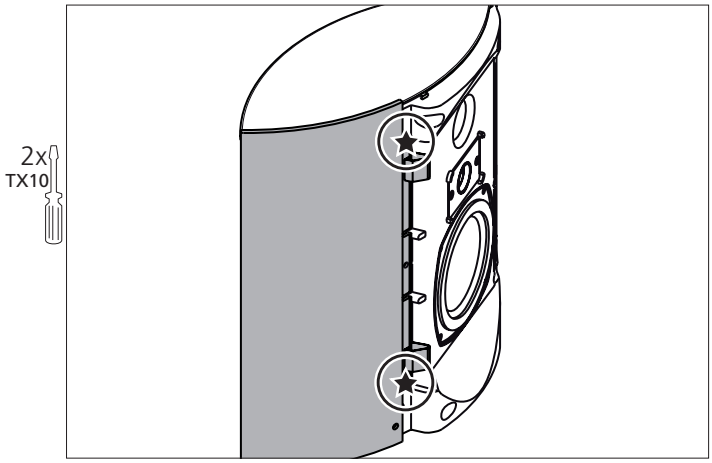
- Remove cables connected to BeoLab 4000 MKII



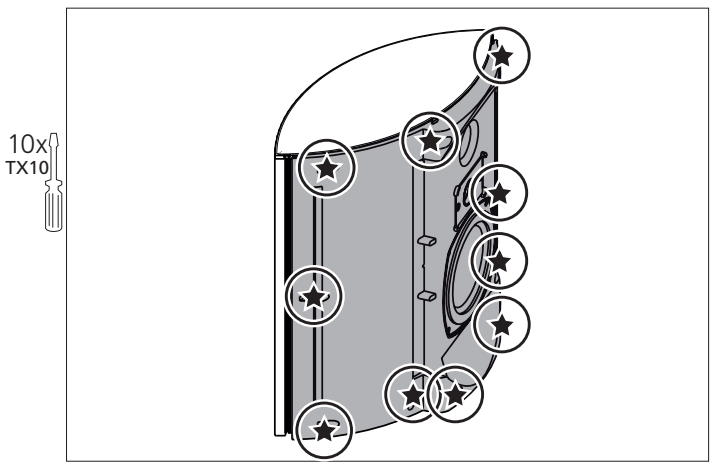
- Remove front frame



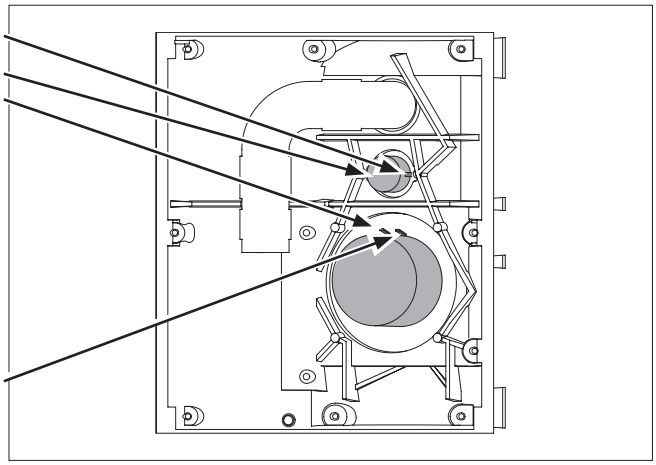
- Remove profile



- Remove screws for baffle

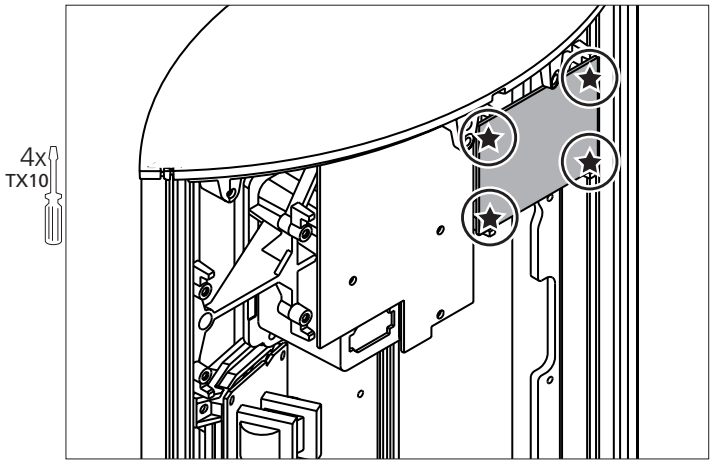


→ - Remove cables for speaker units

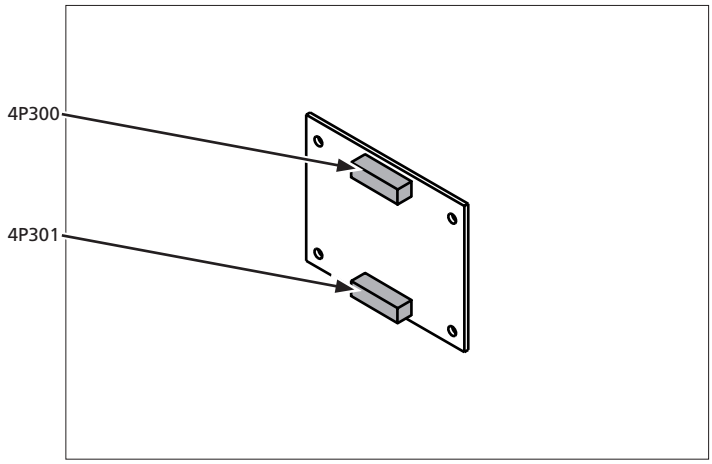


☞ 5.2 BeoLab 4000 MKII in service position

- Remove screws

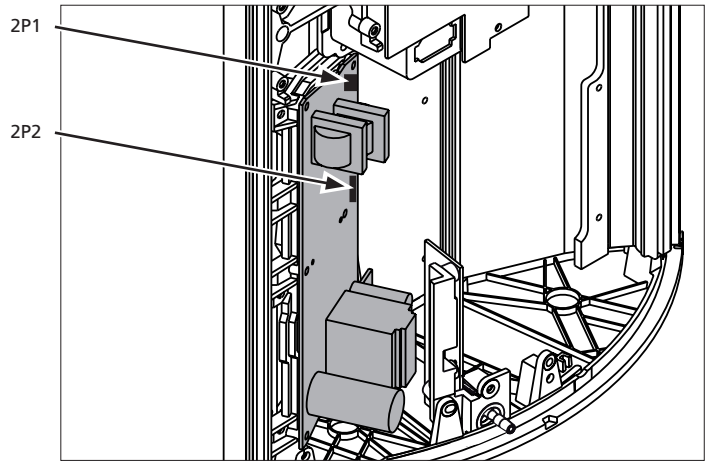


- Remove cables on backside of PCB

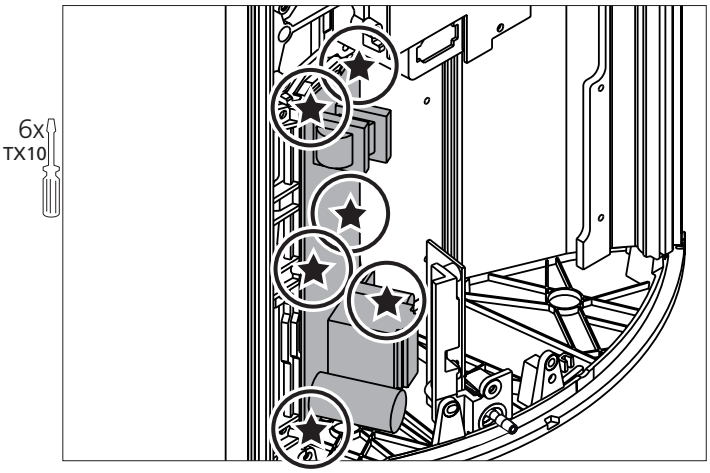


☞ 5.2 BeoLab 4000 MKII in service position

- Remove cables



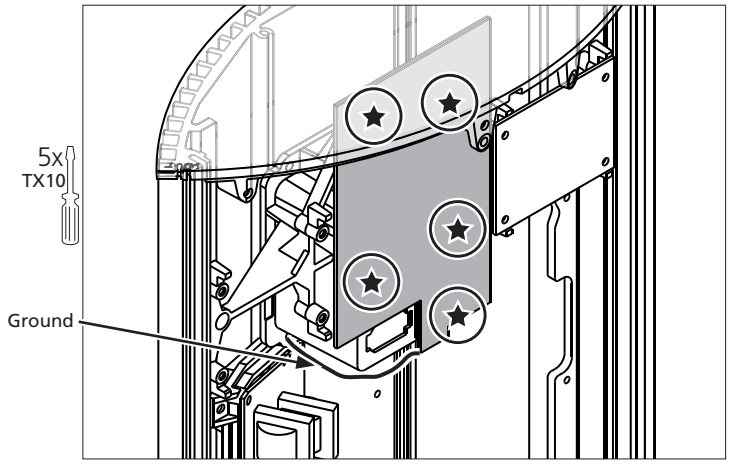
- Remove screws and pull out PCB02, SMPS



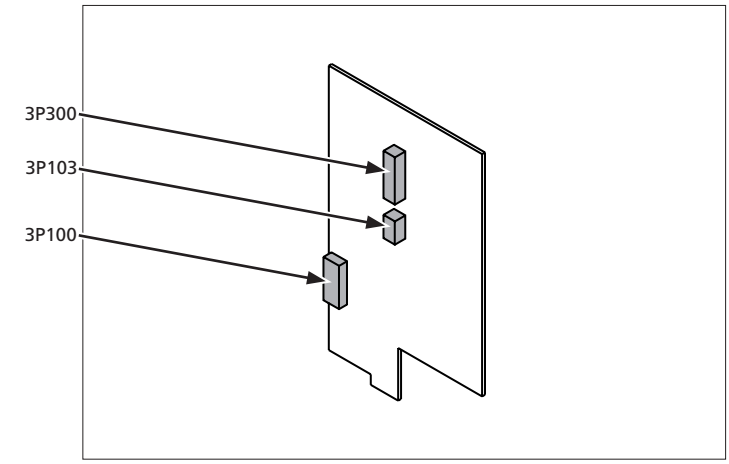
☞ 5.2 BeoLab 4000 MKII in service position

- Remove screws and pull out PCB03, Main PCB

- Remove ground cable!

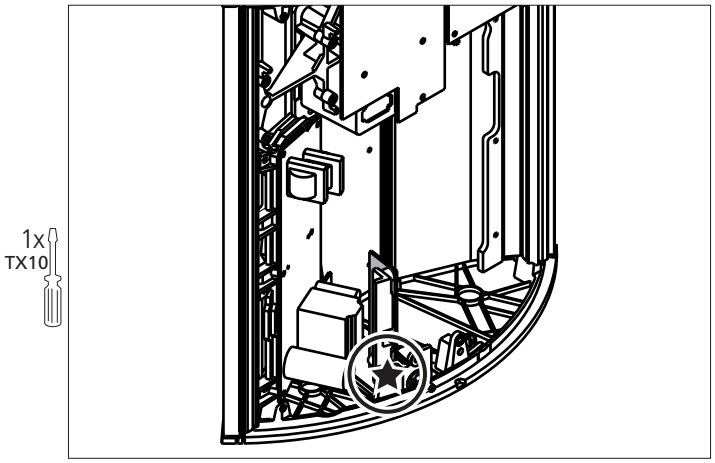


- Remove cables

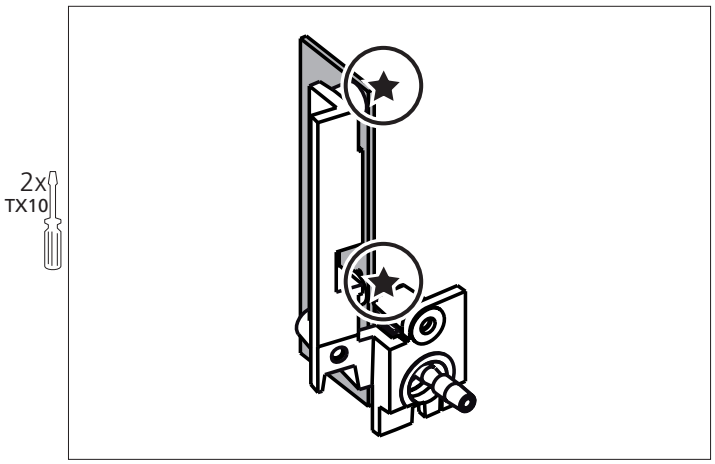


☞ 5.2 BeoLab 4000 MKII in service position

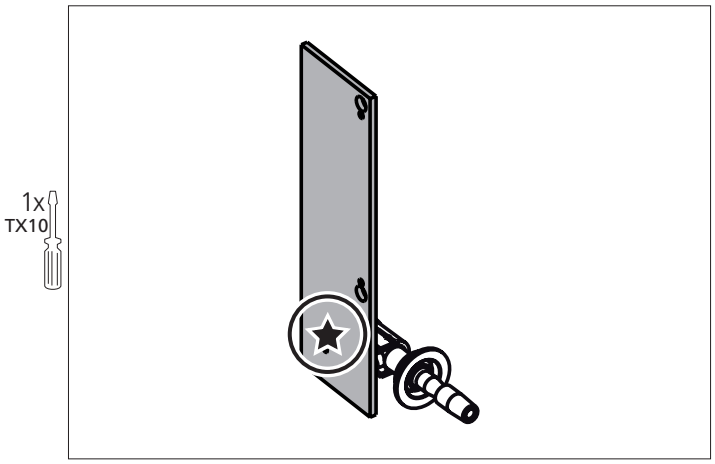
- Remove screw and pull out LED



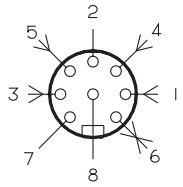
- Remove screws and pull PCB04, LED out



- Remove screw and pull off light guide

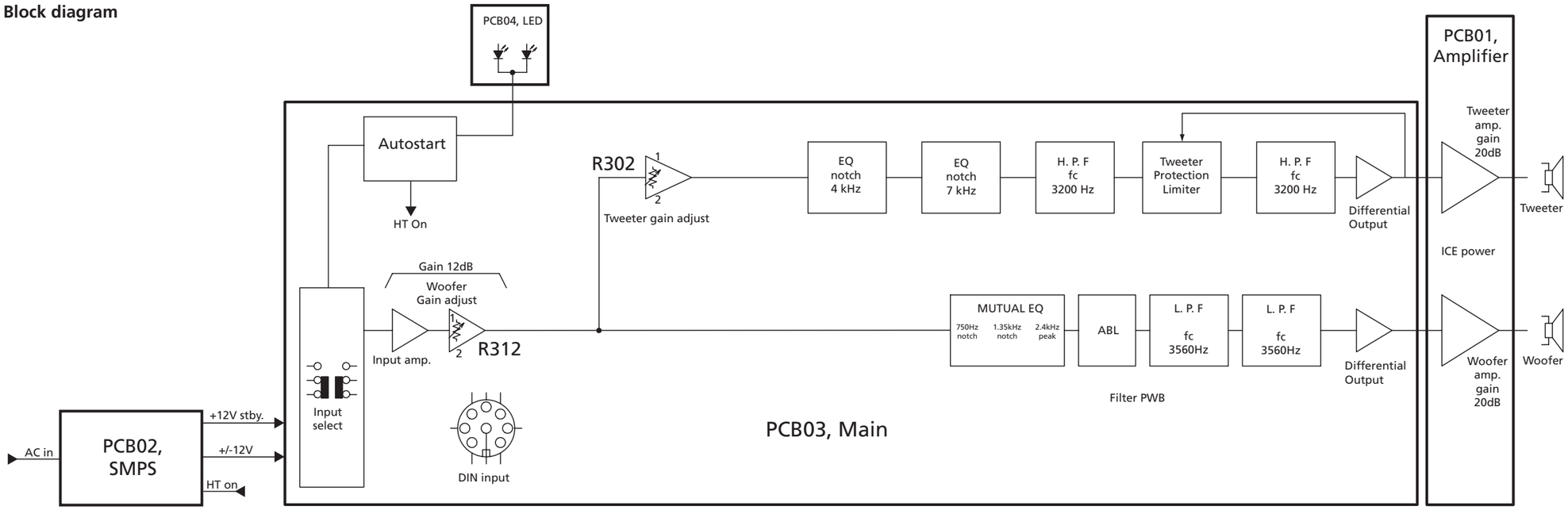


Specification guidelines for service use	BeoLab 4000 MKII
Type	6642 (EU), 6643 (GB), 6644 (US), 6645 (J), 6646 (AUS), 6647 (KOR)
	6648 (CN)
Power supply:	
Voltage	100-240 Volt
Power consumption	Typical: 6 W, Standby: 0.5 W
Cabinet finish	Grey, black, dark grey, yellow, red/black, blue/black
Front cloth	Grey, black, dark grey, yellow, red, blue
Dimensions W x H x D	28 x 32 x 16 cm (with wall bracket)
Weight	4.5 kg
Indicator	LED for On (green) or Off (red)
Operation	Left, Right or LINE, switch
Protection	Thermal protection of SMPS
	Tweeter protection
System data:	
Effective Frequency range	55–20,000 Hz
Sound Pressure Level (SPL)	97 dB/IEC noise 3 m/stereo/room
Input impedance	47kΩ
Harmonic distortion	<6% 90 dB SPL/1 m/250-1000 Hz
	<2% 90 dB SPL/1 m/1000-5000 Hz
Electronics:	
Active crossover network	Linkwitz/Riley
High pass filter	30 dB/octave, 51 Hz
Low frequency equalization	51 Hz/+10 dB
Bass equalization	ABL (Adaptive Bass Linearization)
Acoustics and cabinet:	
Cabinet principle	Bass reflex
Woofer	114 mm (4½"), 8Ω
Tweeter	18 mm (¾"), 8Ω
Magnetically shielded	Yes
Crossover frequency	3.3 kHz
Net volume, bass	4 litres
Power amplifier:	
Signal to noise ratio	>= 84 dBA (1W in Woofer)
Input sensitivity/impedance:	
Input sensitivity Power Link & Line	125 mV (88 dB SPL) Auto switch on
Power link sockets	1V/47 kΩ
Power link channel separation	>55 dB/10,000 Hz
Standby function	Automatic On-Standby
Switch off time (line)	3 min.
Power amplifier, bass	30 W, Class D, ICE power®
Power amplifier, treble	30 W, Class D, ICE power®
Long-term maximum output power	56 W
Connections:	
Power Link	2 x 8-pin socket

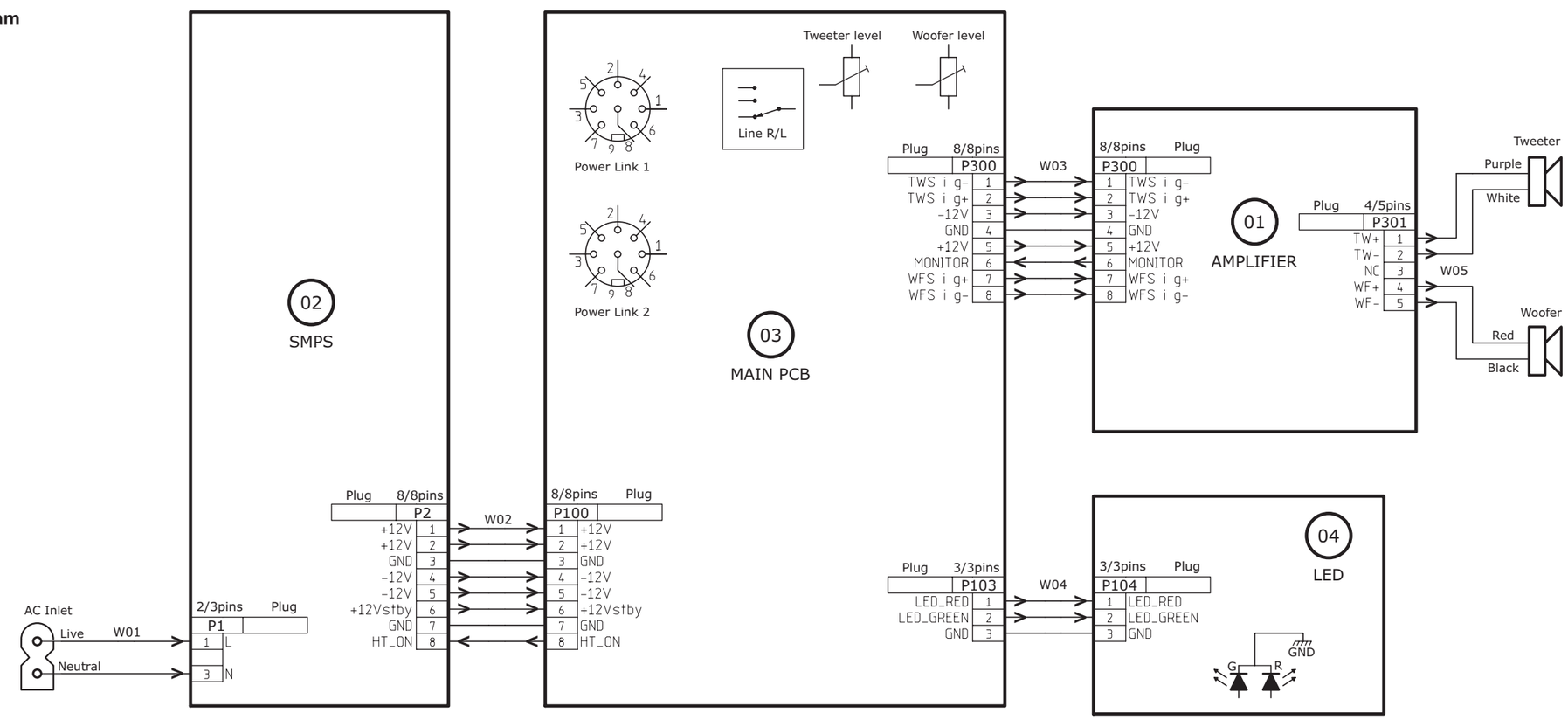


	Pin 1	Power up/down not used (interconnected between the two Power Link plugs)
	Pin 2	Signal GND
	Pin 3	Left in (also used for line in. Note: pin2&7 in the plug must be connected when used for line in)
	Pin 4	Loudspeaker on/sense => 2.5V, OFF =< 0.5V
	Pin 5	Right in
	Pin 6	Data (Not used) (interconnected between the two Power Link plugs)
	Pin 7	Data GND
	Pin 8	(Not used)
	(Jacket:	No connect)

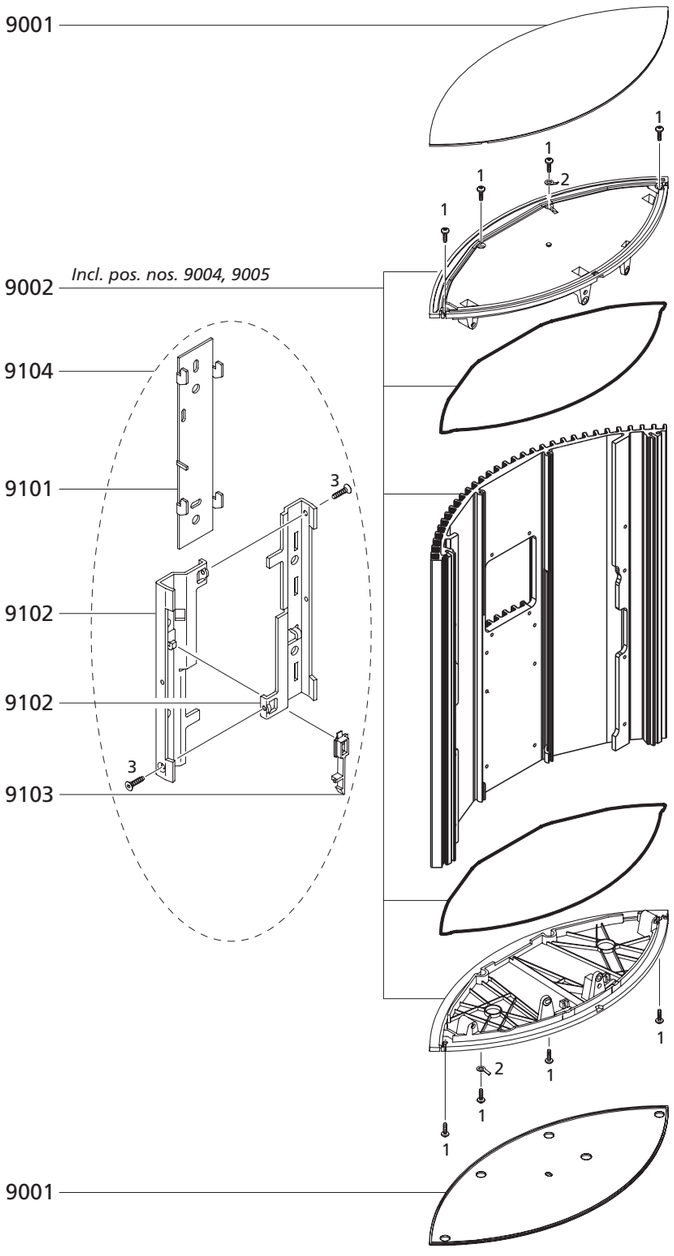
Block diagram

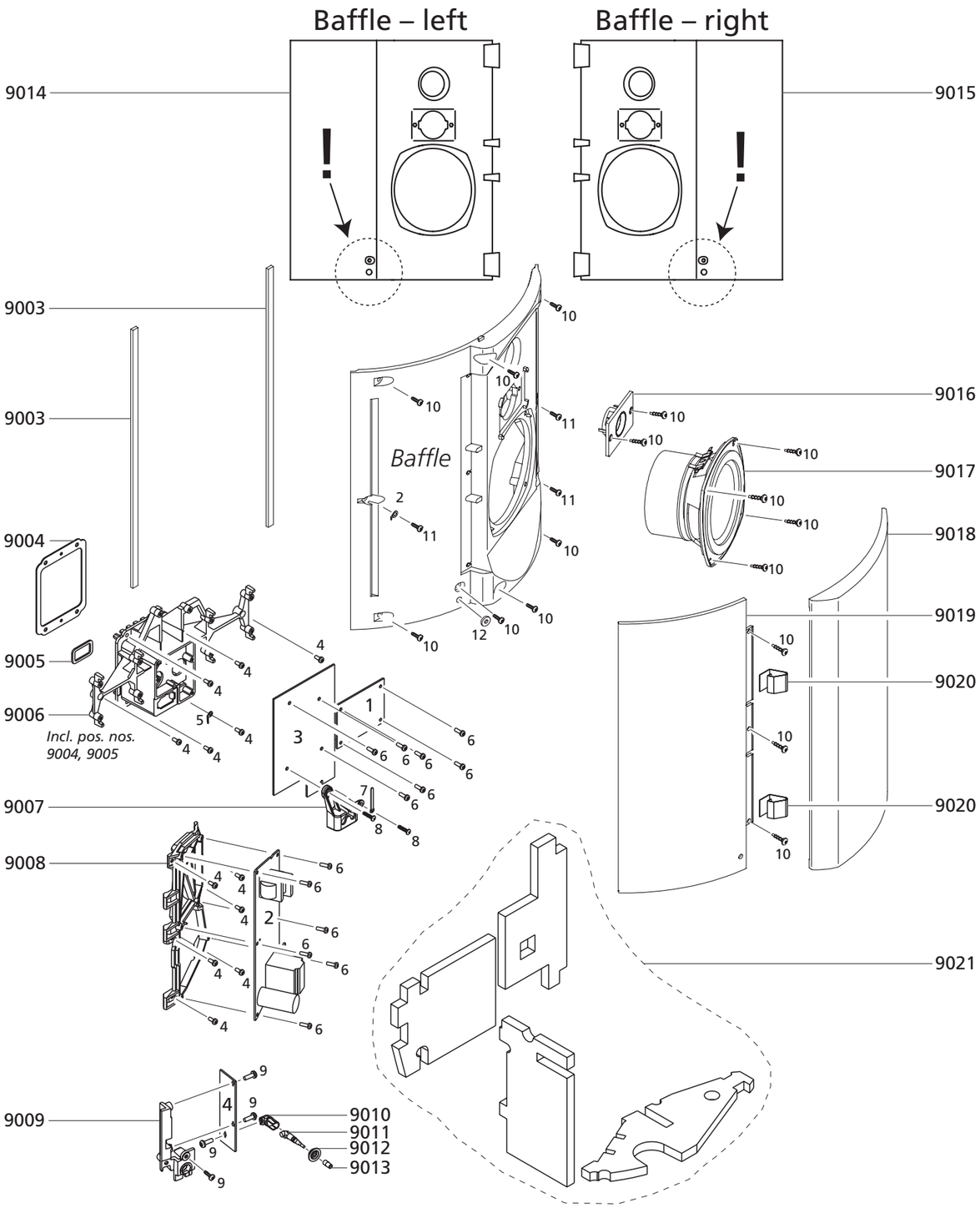


Wiring diagram



Available parts





BeoLab 4000 MKII

9001	3451181	Top/bottom, red
	3451227	Top/bottom, blue
	3451242	Top/bottom, dark grey
	3456201	Top/bottom, aluminium
	3456202	Top/bottom, black
	3456205	Top/bottom, yellow
9002	3358346	Heat sink incl. pos. nos. 9004, 9005
9003	3947350	Foam tape, 10m
9004	3340136	Gasket
9005	3340090	Gasket
9006	3169054	Bracket incl. pos. nos. 9004, 9005
9007	3170226	Shield
9008	3152399	Holder f/PCB2
9009	3151432	Holder f/PCB1
9010	2576128	Adapter
9011	6150039	Light guide
9012	3340134	Gasket f/light guide
9013	2938320	Bush f/light guide
9014	3440162	Baffle, left
9015	3440163	Baffle, right
9016	8480321	Tweeter
9017	8480384	Woofer
9018	3320300	Front frame, black
	3320742	Front frame, grey
	3320750	Front frame, yellow
	3320885	Front frame, dark grey
9019	2568090	Set of profiles, black
	2568111	Set of profiles, yellow
	2568148	Set of profiles, red
	2568150	Set of profiles, blue
	2568158	Set of profiles, dark grey
9020	2816315	Spring
9021	3332015	Set of gaskets
01Module	8003563	PCB01, Amplifier
02Module	8003556	PCB02, SMPS
03Module	8003562	PCB03, Main PCB
04Module	8003555	PCB04, LED
9101	3031601	Bracket f/wall
9102	3031620	Bracket f/speaker
9103	2816297	Clips
9104	3031651	Wall bracket, complete

Screws etc.

1	2013177	Screw 3 x 13mm
2	2816298	Spring
3	2042053	Screw 4 x 16mm
4	2013229	Screw 3 x 6mm
5	7530087	Solder tab
6	2013137	Screw 3 x 10mm
7	7530119	Solder tab
8	2015182	Screw 3 x 13mm
9	2015132	Screw 3.5 x 10mm
10	2015139	Screw 3.5 x 16mm
11	2054046	Screw 3.5 x 12mm
12	3340137	Gasket

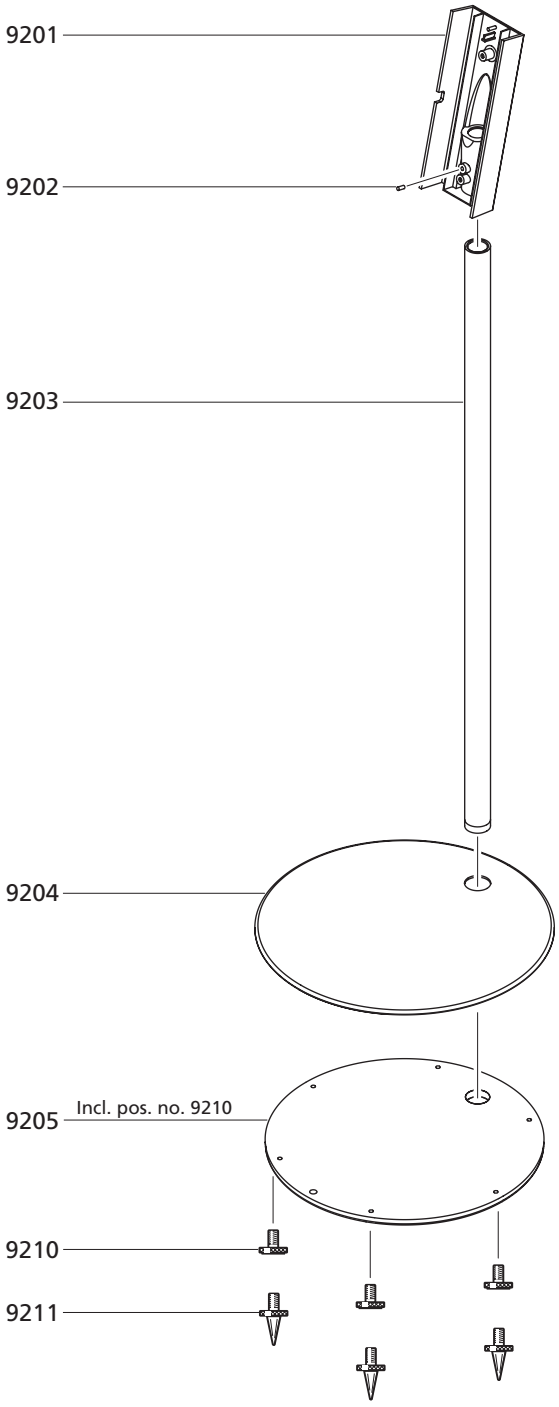
Wires

The W number refers to the Wiring diagram page 7.1

W01	6278171	Wire, Inlet
W02	6278172	Wire, SMPS
W03	6278173	Wire, Amplifier
W04	6278174	Wire, LED
W05	6278175	Wire, speaker

Mains cables	6100273	Mains cable, EU, 3m
	6100329	Mains cable, UK, 3m
	6100307	Mains cable, US, 3m
	6100331	Mains cable, JP, 3m
	6100332	Mains cable, AUS, 3m
	6100386	Mains cable, KOR, 3m
	6100047	Mains cable, China, 3m
Packing	3397996	Set of foam
	3392504	Outer carton
Parts not shown	3658262	Product cover
	3103325	Rubber foot
	3040030	Allen key
	6270041	Power Link cable MKIII, 5m, black
Accessories	1203726	Base
	6270856	Phono male to PL line-in, black, 5 m
	6270433	Stereo mini-jack (male) to 2 x phono-female, black, 3m
Available documentation		See Retail Ordering System

Floor Speaker Stand – type 2069



9201	3031707	Fitting
9202	2072119	Fixing screw
9203	2950216	Aluminium tube
9204	3459257	Cover plate
9205	2752081	Foot incl. pos. no. 9210
9210	3103392	Foot “soft”
9211	3103390	Foot “spike”
	3390616	Bag w/parts (2 screws 4x12mm, 6 pcs. of pos. no. 9211 and 1 torx key
	3504637	Setting-up guide
	3392710	Outer carton
	3396136	Foam packing top/bottom

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